PROPOSED
Reviewed by: CS
January 18, 2006

Covered Source Permit (CSP) No. 0355-02-CT Review
Application for Significant Modification No. 0355-03

Applicant: West Hawaii Concrete

Equipment Description:

This permit application proposes to add a tertiary crusher, two (2) diesel engine generators (DEGs), and two (2) 3-deck screens to its equipment list:

1. 400 tph Canica vertical shaft impactor (model no. 100, serial no. 10012590);
2. 545 kW Caterpillar DEG (model no. 3412, serial no. 81Z09675, max. fuel rate 39.6 gph);
3. 155 kW Caterpillar DEG (model no. 3306, serial no. 66D17769, max. fuel rate 12.6 gph);
4. 6x18 Pep Vari-Vibe III 3-deck screen (serial no. 961224); and
5. 8x20 Deister 3-deck screen (serial no. 1030566).

The permit application also proposes to add serial nos. for two (2) existing screens:

1. 6x20 JCI screen (serial no. 00LPI2132); and
2. 5x16 El Jay screen (serial no. 34C2292).

Plant Location: This worst case scenario will only occur at Waimea Quarry:
Waimea Quarry
Kamuela, HI 96743 (Hawaii)
UTM: Zone 5 224,304m E; 2,209,676m N (NAD-83)

Mailing Address: same as previous review.

Responsible Official/Contact:
same as previous review.

Consultant:
same as previous review.

Proposed Project:
Standard Industrial Classification Code (SICC) is 1429 - crushed and broken stone, not elsewhere classified.

This proposed modification includes the following:

1. Added equipment listed above;
2. At Waimea Quarry only, increase the allowable number of equipment items by one (1) DEG and two (2) screens. Therefore, the maximum equipment combination proposed at Waimea Quarry is the following:

    a. One (1) primary crusher;
    b. One (1) secondary crusher;

c. One (1) tertiary crusher;
d. Three (3) DEGs
e. Four (4) screens; and
f. Various conveyors.

3. When three (3) DEGs are located at Waimea Quarry, the minimum distance between each DEG shall be 100 feet; and
4. The new DEGs will have the following fuel limits

    a. CAT 3412 - 118,800 gal/yr; and
    b. CAT 3306 - 37,800 gal/yr.

This modification is deemed significant (pursuant to Hawaii Administrative Rules) since there will be significant changes to the conditions and significant increases in DEG potential emissions. All other equipment and conditions listed in the permit will remain unchanged.

This permit review is based on the application dated October 18, 2005 and its revisions dated November 30, December 12 and 29, 2005. The application fee of $500.00 for a significant modification to a non-air toxic, temporary covered source permit (with increase of criteria pollutants <40 tpy) will be processed and the receipt will be issued with the permit.

Air Pollution Controls:

same as previous review.

Applicable Requirements:

same as previous review.

Synthetic Minor still applies since the increased emissions do not trigger major source with the proposed changes.

Non-Applicable Requirements:

same as previous review.

Best Achievable Control Technology (BACT) review is not required since the increased emissions do not trigger significant levels. See **Table 1** below:

Table 1
Increase in Potential Emissions

	Previous Facility Potential (tpy)	New Facility Potential (tpy)	Increase/Decrease (tpy)	Significant Level (tpy)
NO_x	44.5	62.39	17.89	40
CO	3.2	12.04	8.84	100
SO_2	10.9	12.23	1.33	40
VOC	0.7	2.26	1.56	40
PM	95.75	38.03	-57.72	25
$PM_{10}/PM_{2.5}$	29.68	14.42	-15.26	15
HAPs	3.41e-02	5.11e-02	1.70e-02	

Insignificant Activities/Exemptions:

The applicant is not proposing any additional insignificant activities or exemptions.

Alternate Operating Scenarios:

The applicant is not proposing any new alternate operating scenario.

Project Emissions:

As mentioned in the **Proposed Project** section, the worst case scenario of increased equipment usage will occur only at Waimea Quarry. Potential emissions shall continue to be limited so that any potential criteria air pollutant emissions at any one (1) site remain below 100 tpy - specifically PM. As stated in HAR 11-60.1-81, a temporary source is required to be non-major.

The potential increase in emissions will be from the added one (1) DEG and two (2) screens. However, the overall production limit will remain the same (2,000,000 tons of processed stone). Also, due to the different plant locations (Waimea and Kona Quarries) for this permit review and the previous one respectively, the potential emissions vary greatly. Waimea's wet climate help reduce potential fugitive emissions from stockpiles, handling, and unpaved roads. Therefore, even with the increased equipment at Waimea Quarry, the potential PM is less than Kona Quarry's potential.

Table 2 represents the maximum facility wide air pollutant emissions based on operating at maximum design capacity with operating limitations. As shown in **Table 2**, the potential individual air pollutant emissions will not exceed 100 tpy with the operating restrictions. The potential PM emissions is less than the previous permit review for application no. 0355-02. Therefore, the only increase in emissions are from the added DEG. This increase is less than significant levels.

The overall fuel limits of 118,800 gal/yr and 37,800 gal/yr for CAT 3412 and CAT 3306 DEGs respectively will ensure that BACT thresholds will not be exceeded. This determination is equipment specific but not site specific. As shown in **Table 2**, the potential NO_x emissions is the limiting factor (below the 40 tpy BACT threshold).

The project emissions were calculated using current AP-42 Factors and manufacturer's data:

3.4 - Large Stationary Diesel Engines (10/96)
11.19.2 - Crushed Stone Processing (8/04)
13.2.2 - Unpaved Roads (12/03)
13.2.4 - Aggregate Handling and Storage Piles (1/95)
Caterpillar Performance Data Sheet for model no. 3306

For detailed emission factors, throughput rates, control efficiencies, and calculations see Appendix A of the application dated 10/18/05.

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Table 2
Worst Case Project Emissions at Waimea Quarry

		Maximum Fugitive Emissions [1] (tpy)	CAT 3412 DEG [2] (tpy)	CAT 3306 DEG [2] (tpy)	Existing 1 MW DEG [3] (tpy)	Total [4] w/ Limits (tpy)	Total [5] 8,760 hr/yr (tpy)	Significant Level (tpy)
NO_x			26.61	11.67	24.11	62.39	>100	40
CO			7.07	2.51	2.46	12.04		100
SO_2			4.20	1.32	6.71	12.23		40
VOC			0.75	0.93	0.58	2.26		40
PM		36.27	0.58	0.82	0.36	38.03	>100	25
$PM_{10}/PM_{2.5}$		12.76	0.48	0.82	0.36	14.42	>100	15
Acetaldehyde			2.10e-04	2.03e-03	3.35e-04	2.58e-03		
Acrolein			6.55e-05	2.45e-04	1.05e-04	4.16e-04		
Benzene			6.45e-03	2.47e-03	1.03e-02	1.92e-02		
Formaldehyde			6.56e-04	3.12e-03	1.05e-03	4.83e-03		
Toluene			2.34e-03	1.08e-03	3.74e-03	7.16e-03		
Xylenes			1.60e-03	7.54e-04	2.57e-03	4.92e-03		
Propylene			n/a	6.83e-03	n/a	6.83e-03		
1,3 Butadiene			n/a	1.03e-04	n/a	1.03e-04		
Total PAH			1.76e-03	4.45e-04	2.82e-03	5.03e-03		
					Total HAPs:	5.11e-02		

Note:
1. Includes the maximum equipment at one jobsite (3 crushers, 4 screens, conveyors, unpaved roads, stockpiles) and 70% efficiency for the use of water sprays.
2. Includes a maximum 118,800 and 37,800 gal/yr of fuel oil no. 2 for the added CAT 3412 and 3306 DEGs respectively.
3. Includes a maximum 189,900 gal/yr of fuel oil no. 2 per location for the 1 MW DEG.
4. Sum of the individual emission sources with operating limits.
5. This plant would be a major source if it operated continuously (8,760 hr/yr). See previous permit review for uncontrolled emissions at the Kona Quarry.

Ambient Air Quality Assessment:

An ambient air quality assessment (AAQA) was performed using ISCST3 (Version 7.10), to determine source compliance with Federal and State ambient air quality standards (NAAQS and SAAQS). The model, methodology and assumptions employed in the AAQA have been determined to be consistent with State and Federal guidelines and are discussed below.

Two (2) worst case scenarios were modeled to show compliance. This includes the simultaneous operation of all three (3) DEGs operating simultaneously at: 1) Waimea Quarry at the designated locations with complex terrain; and 2) simple terrain with a minimum spacing of 100' between the DEGs. The simple terrain was modeled in the event that this worst case scenario would operate at a different location in the future. However, as mentioned in the **Project Emissions** section, potential fugitive emissions would increase significantly due to dryer conditions than Waimea.

The first scenario used an array of 1,114 receptors spaced at 30m (outside of the fenceline) generated from the USGS DEM data for the Nohonaohae quadrangle. The second scenario used a Cartesian grid of 900 receptors spaced at 30m up to the stack.

SCREEN2 and SCREEN3 meteorological data were used for the annual and short term models respectively. This is considered conservative.

All three (3) structures containing the DEGs were used to check for downwash.

Table 3 presents the potential to emit/allowable emission rates and stack parameters of the three (3) DEGs. The derivation of SO_2, NO_x, CO, and PM_{10} emission rates were previously discussed in the **Project Emissions** section. No results were provided for Pb and H_2S because these pollutants are not expected at this facility.

The predicted maximum concentrations (the simple terrain scenario) in **Table 4** were determined with the assumption of the fuel limitations and Tier 1 for NO_2 concentrations (0.75 factor). Background concentrations were taken from the most representative monitoring sites for 2004. Based on these assumptions, the facility is expected to comply with State and Federal AAQS for SO_2, NO_2, CO, and PM_{10}.

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Table 3
Source Emission Rates and Stack Parameters for Air Modeling

SOURCE [1]		EMISSION RATES					STACK PARAMETERS			
Equipment	Stack No.	SO_2 (g/s)	NO_x (g/s)	CO (g/s)	PM_{10} (g/s)	Pb [2] (g/s)	Height (m)	Temp. (K)	Velocity (m/s)	Diameter (m)
1,000 kW DEG	1	0.564	2.025	0.206	0.030	--	7.01	766	64.8	0.25
CAT 3412 DEG	2	0.353	2.235	0.594	0.040	--	5.18	774	69.9	0.20
CAT 3306 DEG	3	0.111	0.980	0.212	0.069	--	3.96	815	82.6	0.10

Note:
1. All three (3) DEGs may operate simultaneously at a site.
2. Lead emission rates are not expected and therefore not modeled.

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Table 4
Predicted Ambient Air Quality Impacts

Air Pollutant	Averaging Time	Maximum [1] Emissions ($\mu g/m^3$)		Background [2] ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	Air Standard ($\mu g/m^3$)	Percent Standard	Impact [3] Location (m, m)
SO_2	3-Hour	169.00		55	224	1300	17%	60, 30
	24-Hour	75.00		21	96	365	26%	60, 30
	Annual [4]	12.90		8	21	80	26%	60, 30
NO_2	Annual [4,5]	60.20		9	69	70	99%	150, 60
CO	1-Hour	272.00		2394	2666	10000	27%	150, 60
	8-Hour	191.00		983	1174	5000	23%	150, 60
PM_{10}	24-Hour	24.70		29	54	150	36%	150, 60
	Annual [4]	4.20		13	17	50	34%	150, 60
Pb [6]	Calendar Quarter	--		--	--	1.5	0%	--
H_2S [6]	1-Hour	--		--	--	35	0%	--

Note:
1. The maximum emissions include all three (3) DEGs operating simultaneously.
2. The background concentrations were taken from Hilo, Hawaii for PM_{10}, Kona, Hawaii for SO_2, and Kapolei, Oahu for NO_2 and CO.
3. The location of impacts are in meters (x, y coordinates) and are at base elevation due to simple terrain.
4. Annual emissions included operating limits, equivalent to 3,000 hr/yr each, for the three (3) DEGs respectively.
5. Tier 2 was used to calculate NO_2 emissions (0.75 of NO_x emissions).
6. Pb and H_2S emissions are not expected at this facility.

Other Issues:

None.

New Permit Conditions:

1. Added equipment listed above;
2. At Waimea Quarry only, increase the allowable number of equipment items by one (1) DEG and two (2) screens. Therefore, the maximum equipment combination proposed at Waimea Quarry is the following:

    a. One (1) primary crusher;
    b. One (1) secondary crusher;
    c. One (1) tertiary crusher;
    d. Four (4) screens; and
    e. Three (3) DEGs.

3. When three (3) DEGs are located at Waimea Quarry, the minimum distance between each DEG shall be 100 feet; and
4. The new DEGs will have the following fuel limits

    a. CAT 3412 - 118,800 gal/yr; and
    b. CAT 3306 - 37,800 gal/yr.

All other equipment and conditions listed in the permit will remain unchanged

Conclusion and Recommendation:

In conclusion, the facility complies with all State and Federal laws, rules, regulations, and standards with regards to air pollution. Therefore, a Significant Modification to Temporary Covered Source Permit for West Hawaii Concrete subject to the above special permit conditions is recommended based on the information provided in the air permit application and subject to the following:

1. Above permit conditions;
2. 30-day public review period; and
3. 45-day EPA review period.